

REMARKS

Claims 1, 34, and 44 have been amended to recite that the oxygen-scavenging particles are capable of reacting with molecular oxygen. Support for this amendment is found in the specification at, for example, page 7, lines 3-5.

Claims 1, 12, 34, and 44 have been amended to recite that at least some particles having a particle size of greater than and less than 25 microns are present, but that those particles less than about 25 microns in size are only present up to a calculated concentration. Support for this amendment is found in the specification at, for example, in Table 2, where Examples 11 through 26 contain particles of 9 microns or less, and on page 22, original claim 7, which recites a particle size range including 20 microns.

Furthermore, new claims 45-48 have been added to provide other potential particle size distributions. Support for these claims is found throughout the specification, for example in Table 1, Examples 1-10. No new matter has been added and, therefore, it is respectfully requested that the amendments and new claims be entered.

Turning to the Office Action, the Examiner has rejected claims 1-5, 7-14, 16-19, 30-38, and 40-44 under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over Venkateshwaran et al, U.S. Pat. No. 5,885,481 (the '481 patent). Applicants have carefully considered this rejection, and respectfully disagree.

The '481 patent teaches oxygen-scavenging compositions comprising an oxidizable metal component and a halogen-free acidifying electrolyte component. Col. 3, lines 28-32. The particle size of the oxygen-scavenging composition is broadly described as at least 50 mesh (300 microns) or smaller. Col. 7, lines 3-5. However, there is no recognition or suggestion whatsoever that, within this broad

range, the particle size distribution of the oxygen-scavenging composition should be controlled. In contrast, the present invention requires that the oxygen-scavenging particles have a particle size distribution such that particles within various particle size ranges are present, and particles of less than about 25 microns in size do not exceed a concentration defined by the formula $\text{ppm} = 512.3 \times d$, wherein ppm is the approximate concentration of particles of less than about 25 microns in size in parts per million by weight, and d is the apparent density of the particles of less than about 25 microns in size in grams per cubic centimeter. Thus, while the '481 patent may suggest keeping the particle size of an oxygen-scavenging composition below about 300 microns (~50 mesh), it does not suggest a *distribution* of particles.

In other words, in contradistinction to the Examiner's position that the broad particle size range disclosed by the '481 patent encompasses the instant particle size limitations of the present invention, the '481 patent does not teach, disclose, or suggest a particle size *distribution* within the broadly disclosed range. The '481 patent simply specifies that the oxygen-scavenging composition should be "at least 50 mesh (300 microns) or smaller," Col. 7, lines 3-5 and that when the oxygen-scavenging composition is incorporated into resin, the amount should be at least 2 parts by weight scavenging composition to 100 parts by weight resin, and more preferably from 5 to 15 parts per hundred. Col. 8, lines 18-20. In contrast, the present invention requires that the oxygen-scavenging particles have a particle size distribution such that particles within various particle size ranges are present, and particles of less than about 25 microns in size do not exceed a concentration defined by the formula $\text{ppm} = 512.3 \times d$, wherein ppm is the approximate concentration of particles of less than about 25 microns in size in parts per million by weight, and d is the apparent density of the particles of less than about 25 microns in size in grams per cubic centimeter.

Furthermore, there is no recognition or suggestion in the '481 patent that the apparent density of the oxygen-scavenging particles is related to the optimum particle size distribution of the particles. In contrast, the present invention requires

that the particle size distribution of the particles is related to the apparent density of the particles such that particles of less than about 25 microns in size do not exceed a concentration defined by the formula $\text{ppm} = 512.3 \times d$, wherein ppm is the approximate concentration of particles of less than about 25 microns in size in parts per million by weight, and d is the apparent density of the particles of less than about 25 microns in size in grams per cubic centimeter.

Therefore, the present invention is not anticipated by the '481 patent because the '481 patent does not teach the critical limitation of particle size distribution claimed in the present invention. See *Union Oil Co.*, 54 U.S.P.Q.2d 1227, 1232 (Fed. Cir. 2000) (stating that claim is anticipated only if each and every element as set forth in the claim is found in a single prior art reference).

With respect to obviousness, the Federal Circuit has stated that, in proceedings before the U.S. Patent and Trademark Office, the Examiner bears the initial burden of establishing a *prima facie* case of obviousness based upon the prior art. *In re Glaug*, 283 F.3d 1335, 1338 (Fed. Cir. 2002). Here, the Examiner has failed to show some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference to achieve the instant invention.

The Examiner has rejected claims 1-5, 7-14, 16-19, 30-38, and 40-44 under 35 U.S.C. § 103(a) as obvious over Venkateshwaran et al., the '481 patent, alone or in view of Yamaji et al., U.S. Pat. No. 4,230,595 (the '595 patent). Applicants have again carefully considered this rejection, and respectfully disagree.

The '595 patent teaches an oxygen scavenger composition consisting of metallic iron and at least one oxidation promoter. Col. 2, lines 51-55. The amount of metallic iron in the scavenger composition is from about 5 to about 90 weight percent. Col. 4, lines 13-15. The metallic iron is characterized by an initial average particle size of not more than 1700 microns, and most preferably not more than 150

microns. Col. 4, lines 6-9. The actual particle size of the metallic iron in the scavenger composition is not disclosed with specificity, because the composition is prepared by mixing the iron with the oxidation promoter and then pulverizing. Col. 9, lines 30-37 and 62-65. Therefore, the actual particle size of oxygen scavenger particles is unknown, but is likely much smaller than 150 microns. The fact that no final particle size range or distribution is disclosed by the '595 patent indicates that these features were not recognized as a result-effective variable. *See In re Antoinie*, 559 F.2d 618, 620 (C.C.P.A. 1977) (stating that discovery of an optimum value of a variable not obvious where the parameter optimized was not recognized to be a result-effective variable).

In the above remarks, Applicants have set forth at least one distinguishing feature between the '481 patent and Applicants' claimed invention. The Examiner has failed to set forth an explanation of why one of ordinary skill in the art at the time the invention was made would have been motivated to make the modifications required to overcome the differences between the claimed invention and the applied references. *See In re Kotzab*, 217 F.3d 1365, 1370 (Fed. Cir. 2000).

Neither the '481 patent nor the '595 patent disclose, teach, or suggest a particle size distribution of oxygen-scavenging particles such that particles within various particle size ranges are present, and particles of less than about 25 microns in size do not exceed a concentration defined by the formula $\text{ppm} = 512.3 \times d$, wherein ppm is the approximate concentration of particles of less than about 25 microns in size in parts per million by weight, and d is the apparent density of the particles of less than about 25 microns in size in grams per cubic centimeter. Nor does either reference teach, disclose or suggest a relationship between the density of the scavenging particles and the particle size distribution. Therefore, even if combined, the cited references do not teach or suggest all of the claim limitations. *See In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974) (stating that, to establish a *prima facie* case of obviousness, all the claim limitations must be taught or suggested by the prior art).

The Examiner has rejected claims 1-4, 6, 10, 11, 34, 36, 37, 39, and 42-44 under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over Nichols, U.S. Pat. No. 5,008,230 (the '230 patent). Applicants have carefully considered this rejection, and again, respectfully disagree.

The '230 patent teaches a catalyst system for producing polyethylene terephthalate (PET). Col. 2, lines 36-38. The catalyst system includes (a) antimony; (b) cobalt or zinc; and (c) zinc, magnesium, manganese, or calcium. Col. 2, lines 44-49. The '230 patent teaches that suitable catalyst compounds are "in the form of inorganic compounds such as carboxylates (such as acetates), compounds of Group VI (such as oxides or sulfides), halides such as chlorides, amines,...". Col. 4, lines 37-41.

The Examiner maintains the rejection for the reasons of record (from the first Office Action), therefore Applicants respectfully point to several inaccurate statements made by the Examiner in the first Office Action. First, the Examiner refers to the catalysts taught by Nichols as "elemental metal catalysts" and "elemental metals," however these references are inaccurate because Nichols teaches compounds containing certain metals combined with other substances, such as acetate ions. The elemental metals employed in Nichols are, therefore, in reality, metal salts. However, contrary to the Examiner's position, the metal salts and amines set forth in Nichols are not capable of reacting with molecular oxygen because they are not in an appropriate oxidation state.

Nevertheless, the Examiner asserts that these metal salts and amines are inherently oxygen scavenging particles. However, the data shown in the accompanying Declaration of Edwin A. Sisson illustrates that metal salts are not necessarily oxygen scavengers, and therefore they are not inherently oxygen scavengers. See *Crown Operations Intl. Ltd. v. Solutia Inc.*, 62 U.S.P.Q.2d 1917, 1923 (Fed. Cir. 2002) (stating that prior reference will not be assumed to inherently contain claimed property unless it is necessarily present and a person of ordinary

skill in the art would recognize its presence). Furthermore, Applicants ask how the Examiner believes a metal salt can scavenge oxygen when it has been fully oxidized? It can't. As shown in the attached Declaration, tests were performed on several of the examples set forth in Nichols. Table 1 therein sets forth the lack of oxygen scavenged over 10, 20, 31 and 40 days by samples of polyethylene terephthalate containing catalyst compounds according to the teachings of the '230 (Nichols) patent, compared to polyethylene terephthalate without the metal salt catalyst compounds. As seen in that Table 1, there is no oxygen scavenged by the catalyst compounds. The oxygen absorbance of the control sample (0.025 cc/ gram polymer) is essentially identical to that of the test samples (0.027 and 0.024 cc/gram polymer, for samples 2 and 3, respectively) after 40 days, meaning the added metal salt catalysts had no effect in scavenging oxygen. Thus, contrary to the Examiner's position, it is clear that not all metal salts inherently scavenge oxygen.

Apart from this inherency issue, the Applicants yet again note that Nichols, like the earlier references, does not teach, suggest or disclose a relationship between particle size distribution, apparent density of the particles, and the concentration of the particles. Furthermore, Applicants again reiterate that Nichols teaches away from using insoluble particles. Col. 4, lines 41-42. That is, Nichols' metal salts are solubilized, and therefore, the reference does not disclose particles as claimed in the present invention.

The Applicants further note that the Examiner appears to continue to assert that the teachings of Nichols meet the instant concentration requirement, and that the polyester bottle resins inherently possess the instant Hunter haze value. Applicants respectfully disagree and ask what in Nichols or another reference allows the Examiner to conclude (wrongly) that a given concentration has an inherent haze. The present invention expressly teaches that the same concentration of a substance can result in different haze values, depending upon the particle size and density of the substance. For example, in Table 2 of the instant specification, it can be seen that a stretched polyester film containing 1000 parts per million (ppm) of

iron particles has a Hunter haze of 16.44 percent when the particles are from about 1 to about 3 microns in size, and a Hunter haze of 8.81 when the particles are from about 7 to about 9 microns in size. Therefore it cannot be said that a film containing 1000 ppm of particles has an inherent Hunter haze value. Significantly, the '230 patent does not mention particle size of the catalyst components, most probably because the catalyst components are soluble and there are not particles present. The '230 patent does not teach or disclose insoluble oxygen-scavenging particles. Indeed, the '230 patent teaches away from using insoluble particles. Col. 4, lines 41-42.

Applicants also respectfully traverse the Examiner's unsupported statement from the first Office Action that antimony, cobalt, and manganese have densities of 6.7 g/cc, 8.9 g/cc, and 7.2 g/cc respectively. As shown and explained in the response to the first Office Action, and as explained in the instant specification, page 12, lines 26-32, metal particles are available with a variety of densities. It cannot reasonably be concluded, therefore, that the compounds disclosed by the '230 patent necessarily have any particular density. It should be noted that the '230 patent contains no mention of the apparent densities of the catalyst compounds.

In summary, the '230 patent does not disclose oxygen scavengers, it does not disclose insoluble particles within a polymer resin, and therefore of course does not disclose the relationship between optimum concentration of particles and the particle size distribution and apparent density. Applicants have provided evidence and arguments that show that these limitations are not necessarily present in the teaching of the '230 patents, and in addition that the metal salt catalyst of Nichols are not inherently oxygen scavengers. The absence of any one of these limitations or lack of inherency negates anticipation of the instant invention.

Furthermore, the '230 patent does not provide any suggestion that would motivate one of skill in the art to make the significant modifications discussed above

to achieve the instant invention. The instant invention is therefore not obvious over Nichols under 35 U.S.C. § 103(a).

The Examiner has rejected claims 1-4, 6-11, 34, 36, 37, and 39-44 under 35 U.S.C. § 103(a) as obvious over Nichols, the '230 patent in view of Venkateshwaran et al., the '481 patent, or Blinka et al., U.S. Pat. No. 6,365,245 (the '245 patent). Applicants have carefully considered this rejection, and respectfully disagree.

The Examiner states that the '481 patent, Col. 4, lines 38-40 and the '245 patent, Col. 3 to Col. 4, support the Examiner's position that catalysts of metal salts and amines taught by Nichols are inherent oxygen-scavenging particles. However, neither the '481 patent nor the '245 patent teach that the catalyst compounds disclosed by Nichols, namely carboxylates, oxides, sulfides, or halides of antimony, manganese, cobalt, zinc, calcium, and magnesium, are oxygen scavengers. The metal salts disclosed by the '481 patent do not support the Examiner's position, because they all contain metals in a less-than-fully-oxidized state, such as iron (II). These are *not* the type of metal salts disclosed by Nichols as catalysts.

Likewise, the '245 patent does not support the Examiner's position that the catalysts taught by Nichols are inherent oxygen-scavenging particles. In Col. 4, lines 28-35, the '245 patent teaches two different oxygen scavengers. The first oxygen scavenger disclosed is ascorbate, which may be activated by a transition metal catalyst. In this system, the transition metal catalyst may be a metal, metal compound such as a salt, or a complex or chelate. Neither the '245 patent nor the incorporated references teach, disclose, or suggest that the metal salt is or can be an oxygen scavenger, although they mention that complexes or chelates may be. In fact, the second oxygen scavenger disclosed is a transition metal complex or chelate of a polycarboxylic or salicylic acid or polyamine. These scavenging compounds, however, are not similar in structure or function to the catalyst compounds disclosed by Nichols, and therefore are not properly comparable.

In Col. 3, line 58 to Col. 4, line 7, the '245 patent discloses a catalyst in the form of a transition metal salt, that is used to catalyze the oxygen-scavenging ability of an ethylenically unsaturated hydrocarbon. There is no suggestion that the transition metal salt itself scavenges oxygen. Indeed, preferred catalysts are described as those that "readily interconvert between at least two oxidation states." Col. 3, lines 53-55. One of ordinary skill in the art would readily recognize that such compounds would not be effective oxygen scavengers because any reaction with oxygen that might take place would be reversible, *i.e.* the oxygen would be released as quickly as it may be reacted.

As further support that these transition metal salts are not oxygen scavengers, the attached Declaration of Edwin A. Sisson provides oxygen scavenging data for a compound that is preferred by the '245 patent and that is a cobalt carboxylate within the scope of the '230 patent, namely cobalt neodecanoate. Cobalt neodecanoate is disclosed as a preferred catalyst in the '245 patent, and is a cobalt carboxylate, which is a type of compound preferred as a catalyst by the '230 patent. Table 2 illustrates the lack of oxygen scavenging of polyester resin compositions comprising cobalt neodecanoate. After 21 days, only 0.012 cubic centimeters oxygen per grams resin (cc O₂/g) was absorbed. This amount is well below any amount that might be minimally absorbed by an oxygen scavenger, and is likely attributed to variations in the volume of the gas chromatograph vials or the absorption of oxygen into the polyester. In any event, it is not evidence of oxygen scavenging. Sample 5 contains 1650 parts per million cobalt neodecanoate. The amount of oxygen scavenged after 21 days is 0.007 cc O₂/g, no more than the comparative resin without cobalt neodecanoate.

Therefore, neither the '481 patent nor the '245 patent support the Examiner's assertion that catalysts of metal salts and amines are inherently oxygen-scavenging particles. Furthermore, there is no teaching or suggestion to substitute the compounds disclosed by the '481 patent or the '245 patent for the catalyst

compounds of Nichols because of the differences in structure and function. *See In re Jones*, 958 F.2d 347, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992).

The Examiner's statement that it would have been obvious to one of ordinary skill in the art to utilize particle sizes of larger than 25 microns in Nichols absent showing the criticality of the recited particles sizes is not well taken. First, Nichols teaches no distribution of particles, both above and below 25 microns. Second, Nichols teaches away from using insoluble particles. Col. 4, lines 41-42. Third, the instant specification is replete with statements of the criticality of the recited particles sizes and support therefor. For example, page 20, lines 1-11, summarizes the variation in Hunter haze results obtained when samples of various concentrations of particle sizes were tested.

Advantageously, as the instant specification sets forth, it has been unexpectedly found that a resin composition having acceptable haze and color characteristics can be achieved when the composition comprises: a film-forming polyester; and an effective amount of oxygen-scavenging particles comprising at least one oxygen-scavenging element capable of reacting with molecular oxygen; wherein the particles have a particle size distribution such that particles within various particle size ranges are present, and particles of less than about 25 microns in size do not exceed a concentration defined by the formula $\text{ppm} = 512.3 \times d$, wherein ppm is the approximate concentration of particles of less than about 25 microns in size in parts per million by weight, and d is the apparent density of the particles of less than about 25 microns in size in grams per cubic centimeter. There is no teaching, disclosure, or suggestion, in any of the three cited references, of this relationship between particle size distribution, density of the particles, and the concentration of the particles. Therefore, the instant invention is not obvious over the Nichols '230 patent in light of the '481 and/or the '245 patents.

The Examiner has rejected claims 1-4, 6, 11, 17, 34, 36, 37, 39, 43 and 44 under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C.

§ 103(a) as obvious over Konagaya et al., U.S. Pat. No. 5,434,000 (the '000 patent). Applicants have carefully considered this rejection, and, yet again, respectfully disagree.

As support for this rejection, the Examiner states that the '000 patent teaches a polyester composition containing 100 ppm of antimony trioxide and magnesium acetate. However, neither 100 ppm antimony trioxide nor magnesium acetate fall within the scope of the oxygen scavengers claimed by the instant invention, because they are not effective oxygen scavengers, i.e. capable of reacting with molecular oxygen. As shown in the accompanying Declaration of Edwin A. Sisson, antimony trioxide and magnesium acetate are not oxygen scavengers. Referring to Table 1, Sample 3 contains substantially higher amounts of both antimony glycolate (antimony trioxide in ethylene glycol) and magnesium acetate than that taught by Konagaya, and yet exhibits no oxygen scavenging ability.

The '000 patent therefore does not anticipate the present invention, which requires oxygen-scavenging particles. Nor does the '000 patent suggest to one of skill in the art that the required oxide compounds can be replaced by oxygen-scavenging particles. The instant invention is therefore not obvious over Konagaya under 35 U.S.C. § 103(a).

The Examiner's statement that the '000 patent falls within the particle size requirement of the instant invention whether the antimony trioxide or magnesium acetate is smaller than 25 microns in size or larger than 25 microns in size is inconsistent with the teaching in the '000 patent that the mixture of these ingredients with the polyester precursors forms a "solution" (see col. 7, lines 6-12), and therefore no particles could be present. Furthermore, the instant claims, as amended, recite a particle size distribution such that particles within various particle size ranges are present, and particles of less than about 25 microns in size do not exceed a concentration defined by the formula $\text{ppm} = 512.3 \times d$, wherein ppm is the approximate concentration of particles of less than about 25 microns in size in

parts per million by weight, and d is the apparent density of the particles of less than about 25 microns in size in grams per cubic centimeter. This limitation is not taught, disclosed, nor suggested by the '000 patent.

The Examiner has rejected claims 1-4, 6, 11, 30-34, 36, 37, 39, 43, and 44 under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over Kriesche et al., U.S. Pat. No. 5,565,545 (the '545 patent). Applicants have carefully considered this rejection, and respectfully disagree.

Initially, Applicants wish to rely on well-established case law from the U.S. Federal Circuit Court of Appeals stating that, for a limitation to be "inherent," it must be necessarily present and a person of ordinary skill in the art would recognize its presence. *Crown Operations Int'l Ltd. v. Solutia Inc.*, 62 U.S.P.Q.2d 1917 (Fed. Cir. 2002); *In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 19950-1 (Fed. Cir. 1999); *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1270, 20 U.S.P.Q.2d 1746, 1750-1 (Fed. Cir. 1991). Inherency may not be established by probabilities or possibilities. *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981).

The Examiner has stated that three things are inherent in the '545 reference. First, in the previous Office Action and maintained in the second Office Action, the Examiner states that, "[the '545] polyester resins inherently yield the instant Hunter haze value since Kriesche et al teach transparent packaging with a low haze value." However, in column 5, claim 1 of the '545 patent, Kriesche claims a method for producing a polyester resin with a haze value of between 0.5 and 20 NTUs. Therefore, the polyester resins of the '545 patent do not necessarily have a low haze value, but can vary over a wide range and up to the high haze value of 20 NTU. Therefore they do not inherently have a low haze.

The second feature that the Examiner states is inherent in the '545 patent is "Sb is present as a particle inherently." However, the '545 patent teaches that

suitable antimony and germanium compounds must be soluble in the polyester. Col. 2, lines 63-65. Indeed, the '545 patent teaches away from adding particles to the resin. Col. 1, lines 9-10 ("without adding particles that are insoluble in the polyester"); Col. 6, lines 3-4 ("in the absence of other substances that would affect the haze value"). There is no reasonable interpretation of the word "particle" that would validate this interpretation. A substance that has been solubilized, by definition, does not contain particles. Otherwise, it is a suspension or dispersion. Mere atoms of matter are not particles either. Otherwise, everything on earth, including liquids and gases, would meet that definition. The '545 patent does not teach the use of elemental antimony. In contrast, the present invention requires oxygen-scavenging particles.

Third, the Examiner states that, "catalysts of metal salts are inherent oxygen-scavenging particles." Applicants point to the accompanying Declaration of Edwin A. Sisson, which provides data that shows several metal salts are not oxygen scavengers. Specifically, as shown in Table 1, Samples 2 and 3 contain substantially higher amounts of antimony glycolate (antimony trioxide in ethylene glycol) than that taught by Kriesche, and yet exhibit no oxygen scavenging ability, as discussed above. Further, germanium dioxide is not capable of being an oxygen scavenger, because the germanium is already present in its highest oxidation state (+4).

The '545 patent does not teach or disclose the addition of oxygen-scavenging particles to resin, and therefore does not anticipate the present invention. Furthermore, it would not be obvious to add oxygen-scavenging particles to the '545 resin, because the '545 patent teaches away from adding particles. See *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).

The Examiner has rejected claims 1-4, 6, 11, 30-34, 36, 37, 39, 43, and 44 under 35 U.S.C. § 103(a) as obvious over Kriesche et al., the '545 patent, in view

of Venkateshwaran, the '481 patent, or Blinka, the '245 patent. Applicants have carefully considered this rejection, and respectfully disagree.

Kriesche et al. teach a process for adjusting the haze value of ethylene terephthalate polymers that depends upon the amount of antimony and germanium compounds present during esterification. Col. 1, lines 6-7; col. 2, lines 5-17. The preferred antimony and germanium compounds are antimony trioxide, antimony triacetate, and germanium dioxide. None of these compounds are disclosed by either the '481 patent or the '245 patent as oxygen scavengers. In this regard, Applicants refer the Examiner to the discussion hereinabove of the specific types of compounds disclosed by the '481 patent and the '245 patent as potential oxygen scavengers. There are significant structural and functional differences between these potential oxygen scavengers and the compounds disclosed by the '545 patent as catalysts.

As further support that the antimony and germanium catalysts disclosed by the '545 patent are not oxygen scavengers, the Examiner is referred to the attached Declaration of Edwin A. Sisson, which provides oxygen scavenging data for a number of metal salts. As shown in Table 1, Samples 2 and 3 contain substantially higher amounts of antimony glycolate (antimony trioxide in ethylene glycol) than that taught by Kriesche, and yet exhibit no oxygen scavenging ability, as discussed above. Further, germanium dioxide is not capable of being an oxygen scavenger, because the germanium is already present in its highest oxidation state (+4).

As stated above, neither the '481 patent nor the '245 patent support the Examiner's assertion that catalysts of metal salts and amines are necessarily oxygen-scavenging particles. Furthermore, there is no teaching or suggestion to substitute the compounds disclosed by the '481 patent or the '245 patent for the catalyst compounds of Kriesche because of the differences in structure and function. Federal Circuit case law has stated that an obviousness rejection is improper under such circumstances. See *In re Jones*, 958 F.2d 347, 21 U.S.P.Q.2d 1941 (Fed. Cir. 1992)

(requiring some suggestion to combine references to arrive at the claimed invention).

Even if combined, the cited references do not disclose, teach or suggest the instantly claimed particle size distribution and therefore do not render the instant invention obvious under the Patent Statutes.

Applicants note that in supporting this rejection, the Examiner referred to Nichols as an apparent mistake. If this was not a mistake, and the Examiner intended to combine Nichols with the other three cited references, Applicants respectfully request that the Examiner clarify his basis for rejection over these combined references and allow Applicants an opportunity to address this combination. This notwithstanding, the Applicants again point out, however, the improper combination of Nichols and Blinko and the data provided in Mr. Sisson's Declaration clearly showing the non-inherency of Nichols' metal salts as oxygen scavengers.

The Examiner has rejected claims 1-4, 6-9, 11, 30-37, 39-41, 43, and 44 under 35 U.S.C. § 103(a) as obvious over Tindale, U.S. Pat. No. 5,419,936 (the '936 patent) in view of the Aldrich Chemical Catalog, page 122 (1988). Applicants have carefully considered this rejection, and again respectfully disagree.

The '936 patent teaches a polymer composition comprising metal particles in an amount of from about 3 to 300 ppm with a reduced reheat time. Col. 1, lines 57-60; col. 3, lines 8-10. No requirement or suggestion of oxygen-scavenging ability is present in the '936 patent. In fact, research by Applicants' assignee of record has shown that 300 parts per million of antimony particles reduced *in situ* according to the teaching of Tindale is not an effective amount of oxygen-scavenging particles. As detailed in the accompanying Declaration of Edwin A. Sisson, the patent disclosure was followed exactly in terms of antimony and phosphorus concentrations, and it was found that most of the antimony oxide was

deactivated, either by reaction with the phosphoric acid to produce antimony phosphate compounds or by being reduced to the metal. There was insufficient catalytic antimony oxide left to adequately catalyze the melt polymerization and subsequent solid state polymerization. Nevertheless, Assignee's non-inventor research team was able to alter the method to polymerize the polymer and reduce the antimony as required in Tindale. More specifically, the phosphoric acid was omitted and the amount of antimony catalyst was increased such that, after 300 ppm antimony was reduced with triphenyl phosphite, there remained enough unreduced antimony to catalyze the polymerization. However, after 20 days, the oxygen absorbance of three samples prepared in this manner was measured to be 0.011, 0.005 and 0.003 cc O₂/gram polymer. A control sample containing antimony only and no triphenyl phosphite provided an oxygen absorbance of 0.005 cc O₂/gram polymer after 20 days. These rates of absorbance of the oxygen are considered to be extremely low and do not show the presence of oxygen scavenging, particularly when compared to other oxygen scavenging particles which more typically have an oxygen absorbance of 0.5 cc O₂/gram polymer or more after about 20 days. Indeed, these oxygen absorbances are lower than the Sample 1 from Table 1, which does not contain antimony.

In addition, one of ordinary skill in the art would not be motivated to increase the amount of antimony particles beyond 300 parts per million, because Tindale effectively teaches away from higher levels. See Col. 3, lines 4-11 (stating that the amount of antimony must be balanced between the amount necessary for improved reheat and the level of acceptable haze). There is no teaching, disclosure or suggestion in the cited references that the haze will be acceptable at antimony levels above 39.6 parts per million.

Furthermore, no particular particle size is disclosed or suggested, except that the particles are sufficiently fine for them not to be visible to the eye. Col. 2, lines 51-56. Furthermore, the '936 patent does not teach, disclose, or suggest a particle size distribution in which particles within various particle size ranges are

present, and particles of less than about 25 microns in size do not exceed a concentration defined by the formula: $\text{ppm} = 512.3 \times d$, wherein ppm is the approximate concentration of particles of less than about 25 microns in size in parts per million by weight, and d is the apparent density of the particles of less than about 25 microns in size in grams per cubic centimeter.

The combination of the '936 patent with the Aldrich Chemical Catalog (Aldrich) excerpt provided by the Examiner does not support an obviousness rejection because Aldrich merely lists a variety of antimony substances that are commercially available. Elemental antimony is provided in a number of particle sizes, but none are provided having the particle size distribution of the instant invention. In fact, no particle size distribution is disclosed, taught or suggested for elemental antimony. No particle size or particle size distribution is disclosed, taught or suggested for the antimony oxide products. Therefore, even if combined, the cited references do not teach or suggest all of the claim limitations of the instant invention, and the Examiner has failed to make a *prima facie* case of obviousness over Tindale under 35 U.S.C. § 103(a) in view of Aldrich. See *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974).

The Examiner has rejected claims 1-4, 6, 11, 30-34, 36, 37, 39, 43, and 44 under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over Pengilly, U.S. Pat. No. 4,535,118 (the '118 patent). Applicants have carefully considered this rejection, and respectfully disagree.

Pengilly teaches a polyester comprising carbon black, the polyester having improved infrared light absorption capacity. Col. 1, lines 11-15. The polyester is prepared by using an antimony catalyst, a phosphorus compound, and a bluing agent. Col. 4, lines 65-68. The antimony catalyst is a trivalent organic antimony compound. Col. 5, lines 1-2. The bluing agent is a cobalt compound such as cobalt acetate tetrahydrate, cobalt aluminate, cobalt benzoate, and cobalt chloride. Col. 5, lines 15-16, col. 6, lines 18-21.

In support of this rejection, the Examiner states that catalysts of metal salts and chloride are inherent oxygen-scavenging particles and have a particle size larger than 25 microns. In response, Applicants submit objective evidence to show that compounds of antimony and cobalt such as those disclosed by Pengilly are not oxygen scavengers because they are not capable of reacting with molecular oxygen. Again, reference is made to Samples 2 and 3 in Table 1 of the accompanying Declaration of Edwin A. Sisson, which contain antimony glycolate and cobalt acetate compounds in amounts greater than what is taught by Pengilly, and yet exhibit negligible oxygen scavenging ability, as discussed above. Therefore, the '118 patent does not expressly or inherently disclose oxygen-scavenging particles.

Additionally, the '118 patent does not teach, disclose or suggest the claimed particle size distribution of the present invention. In fact, the '118 patent teaches away from adding particles to the resin. Col. 1, lines 9-10 ("without adding particles that are insoluble in the polyester"; Col. 6, lines 3-4 ("in the absence of other substances that would affect the haze value"). The present invention is therefore not anticipated by Pengilly under 35 U.S.C. § 102(b), nor obvious over Pengilly under 35 U.S.C. § 103(a).

The Examiner has rejected claims 1-4, 6-9, 11, 30-34, 36, 37, 39-41, 43, and 44 under 35 U.S.C. § 103(a) as obvious over Pengilly, the '118 patent, in view of the Aldrich Chemical Catalog, page 122 (1988) and Venkateshwaran, the '481 patent, or Blinka, the '245 patent. Applicants have carefully considered this rejection, and respectfully disagree.

The Examiner states that the catalysts of metal salts and chloride taught by Pengilly are inherent oxygen-scavenging particles, and that the '481 and '245 patents support this position. Applicants refer to their arguments, presented hereinabove, to assert that the '481 and '245 patents do not support such a broad position, but are directed to specific types of compounds that are structurally and functionally distinct from the compounds taught by Pengilly. Further, Applicants

submit objective evidence in the accompanying Declaration of Edwin A. Sisson, to show that antimony and cobalt salts are not oxygen scavengers. Again, reference is made to Samples 2 and 3 in Table 1, which contain antimony glycolate and cobalt acetate compounds in amounts greater than what is taught by Pengilly, and yet exhibit no oxygen scavenging ability, as discussed above.

Even if the '245, '481, and '118 patents are combined with Aldrich, they fail to disclose or suggest all of the instant claim limitations. Namely, they do not disclose or suggest a particle size distribution such that particles within various particle size ranges are present, and particles of less than about 25 microns in size do not exceed a concentration defined by the formula $\text{ppm} = 512.3 \times d$, wherein ppm is the approximate concentration of particles of less than about 25 microns in size in parts per million by weight, and d is the apparent density of the particles of less than about 25 microns in size in grams per cubic centimeter.

Applicants note that in supporting this rejection, the Examiner referred to Tindale as an apparent mistake. If this was not a mistake, and the Examiner intended to combine Tindale with the other four cited references, Applicants respectfully request that the Examiner clarify his basis for rejection over these combined references and allow Applicants an opportunity to address this combination. This notwithstanding, the Applicants refer the Examiner to its prior arguments and the Declaration of Edwin A. Sisson showing the non-inherency of the materials used in Tindale as oxygen scavengers.

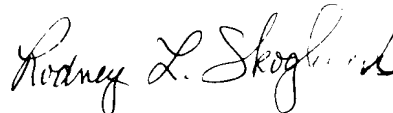
The instant invention provides packaging materials having acceptable visual aspects and comprising oxygen scavenging resin compositions. This oxygen-scavenging resin composition has utility in packaging and other applications. It has been unexpectedly discovered that oxygen-scavenging particles can be incorporated into a film-forming polyester resin composition with low haze when the particle size distribution of the particles is carefully controlled, taking the apparent density of the particles into account.

In view of the foregoing amendments and arguments, the Applicants respectfully request the Examiner to reconsider and withdraw the rejection of claims 1-14, 16-19, and 30-44, and allow new claims 45-46. Applicants note that claims 20-29 are allowed. The Examiner objects to claim 15 as dependent upon a rejected base claim, but states that claim 15 would be allowable if rewritten in independent form. In view of the arguments presented herein, Applicants believe that independent claim 12 is patentable, and therefore respectfully request that the Examiner withdraw the objection to claim 15.

Four new claims have been added, totaling \$336.00. Also, enclosed with this Response and Amendment B is a Petition for a three month Extension of Time, totaling \$930.00. Therefore, a check in the total amount of **\$1,266.00** is enclosed, for both the new claims and the extension fee. In the event an additional fee required for the filing of this document is necessary, the undersigned hereby authorizes the Commissioner to charge payment of any fees associated with this communication or to credit any overpayment to Deposit Account No. 18-0987.

A formal notice of Allowance of claims 1-48 is earnestly solicited. Should the examiner wish to discuss any of the foregoing in greater detail, the undersigned attorney would welcome a telephone call.

Respectfully submitted,



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